

Figure 1 displays 12 histograms arranged in a 6x2 grid, showing the distribution of the number of non-zero elements in the vector x for different values of n and m . The columns represent $n=10$ and $n=20$, and the rows represent $m=10, 20, 30, 40, 50, 60$. The x-axis for all histograms is 'Number of non-zero elements' (ranging from 0 to 100), and the y-axis is 'Frequency' (ranging from 0 to 100). The distributions are centered around 50 for $n=10$ and around 100 for $n=20$. The distributions become narrower and taller as m increases.

Andreas Wachtler et al.

Filed: August 9, 2001 : Examiner: Not Assigned

For: PERFLUORO-N-ALKANESULFONIC ACID DERIVATIVES

Commissioner for Patents
Washington, D.C. 20231

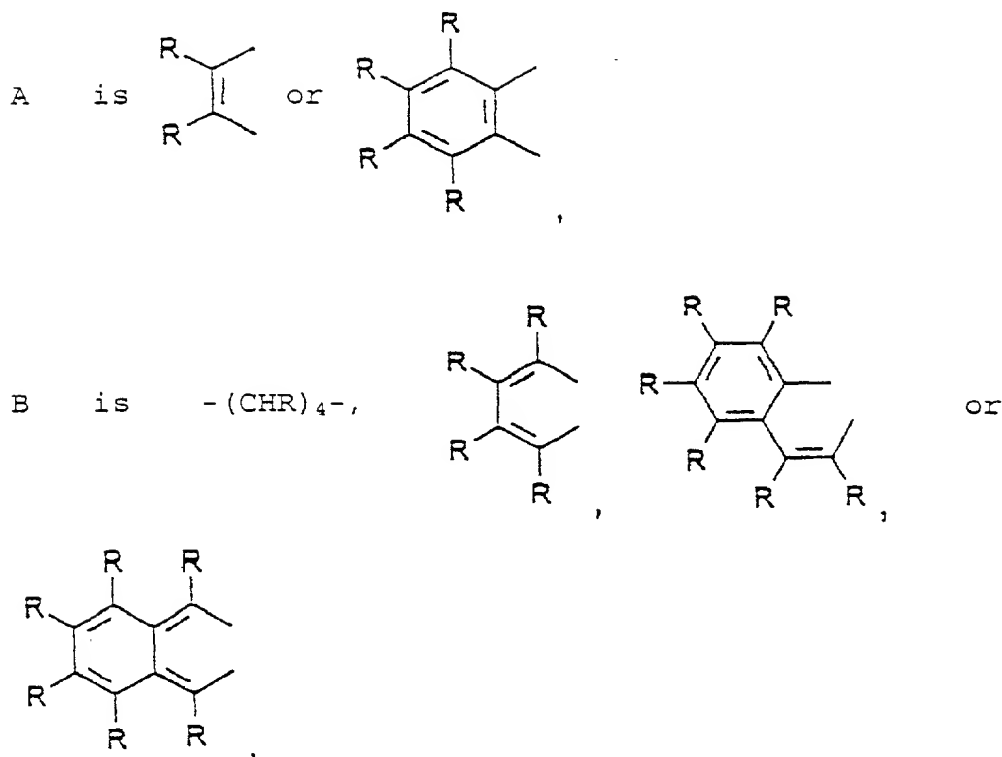
Sir:

In connection with the filing of this divisional application of parent application Ser. No. 09/600,295, kindly amend the above-identified application as follows.

Amend claims 1, 3 and 5-7 to read as follows (a marked up version of the amended claims is in an appendix attached hereto):

-
- The diagram shows a chemical structure of a bisphenol A derivative. It consists of two phenyl rings connected by a central carbon-carbon bond. Each phenyl ring has a trifluoromethylsulfonyl group ($\text{OSO}_2(\text{CF}_2)_n\text{CF}_3$) attached to it. The rings are labeled with 'A' and 'B' at the ortho positions relative to the central bond. The trifluoromethylsulfonyl groups are attached to the para positions relative to the central bond.

n is 3, 4, 5, 6, 7, 8 or 9,



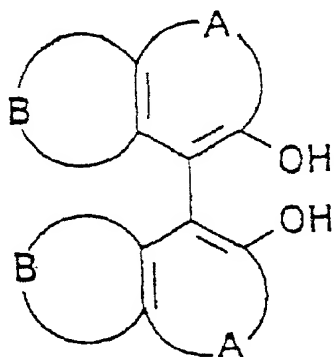
where nonadjacent groups $=\text{CR}-$ are optionally replaced by $=\text{N}-$, and $-\text{CHR}-$ are optionally replaced by $-\text{NR}-$, $-\text{O}-$ or $-\text{S}-$, provided that at least one $=\text{CR}-$ or $-\text{CHR}-$ group is so replaced,

and

R is alkyl or alkoxy having from 1 to 12 carbon atoms, halogen, $-\text{CN}$, $-\text{CF}_3$, $-\text{OCF}_3$ or unsubstituted phenyl or phenyl which is monosubstituted or polysubstituted by alkyl or alkoxy having from 1 to 12 carbon atoms, halogen or $-\text{CN}$, where if more than one R is present the substituents R may be identical or different.

3. (Twice Amended) A compound of the formula I according to Claim 1, wherein R is alkyl or alkoxy having from 1 to 7 carbon atoms, F, Br, CN, $-\text{CF}_3$, $-\text{OCF}_3$.

5. (Amended) A process for preparing a compound of claim 1, which comprises reacting a compound of the formula II:



II

where A and B are as defined with a perfluoro-n-alkanesulfonyl fluoride, chloride or anhydride in the presence of a base.

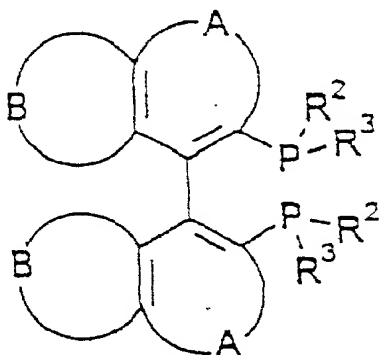
6. (Amended) The process of Claim 5, wherein the compounds of the formula II are reacted with nonafluoro-n-butanesulfonyl fluoride or perfluoro-n-octanesulfonyl fluoride in the presence of a base.

7. (Twice Amended) The process of Claim 5, wherein the base used is a pyridine, a pyrimidine, a pyridazine, a trialkylamine or a dialkylarylamine.

Cancel claims 2, 4 and 8-10 without prejudice or disclaimer.

Please add the following new claims 11-21.

-- 11. A method for preparing a diphosphine of formula III using a bis(perfluoro-n-alkanesulfonate) compound of the formula I of claim 1, which comprises reacting a compound of the formula I, in the presence of a transition metal and a base, with either a phosphine of the formula IV or zinc and a phosphine of the formula V:

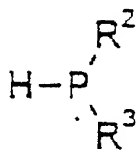


III

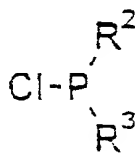
where A and B are as defined above

and

R², R³ are phenyl, 4-methylphenyl, 3-methylphenyl, 2-methylphenyl, 3,5-dimethylphenyl, 3,5-ditert-butylphenyl, 4-methoxyphenyl, 3-methoxyphenyl, 2-methoxyphenyl, 3,5-dimethoxyphenyl, cyclohexyl or cyclopentyl;



IV



V

where R² and R³ are as defined above.

12. A process according to Claim 11, wherein the transition metal catalyst used is a nickel catalyst.

13. The compound of claim 1, wherein at least one R is an optically active organic radical having an asymmetric carbon.

14. The process of claim 5, wherein the reaction is conducted at a temperature of -30 °C to +70 °C.

15. The process of claim 5, wherein the molar ratio of the compound of formula II to the perfluoro-n-alkanesulfonyl fluoride, chloride or anhydride is from 1:2 to 1:20.

16. The method of claim 11, wherein R^2 and R^3 are both phenyl.

17. The method of claim 11, wherein the reaction is conducted at a temperature from 20 °C to 150 °C.

18. The method of claim 11, wherein the compound of formula I is reacted with zinc and a phosphine of the formula V and the molar ratio of the compound of the formula I to the zinc is from 1:2 to 1:40.

19. The method of claim 11, wherein the molar ratio of the compound of the formula I to the phosphine of formula IV or phosphine of formula V is from 1:2 to 1:20.

20. The method of claim 11, wherein the molar ratio of the compound of the formula I to the base is from 1:2 to 1:20.

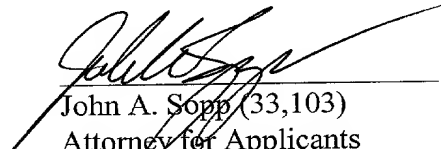
21. The method of claim 11, wherein the molar ratio of the compound of the formula I to the transition metal is from 100:1 to 2:1. --

REMARKS

The claims are amended so that they are directed to the subject matter non-elected pursuant to the restriction requirement made in the parent application. Further amendments are made to conform the claims to U.S. practice and additional dependent claims are added.

The amendments either do not narrow the scope of the claims and/or were not made for purposes related to patentability.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John A. Sopp", is written over a horizontal line.

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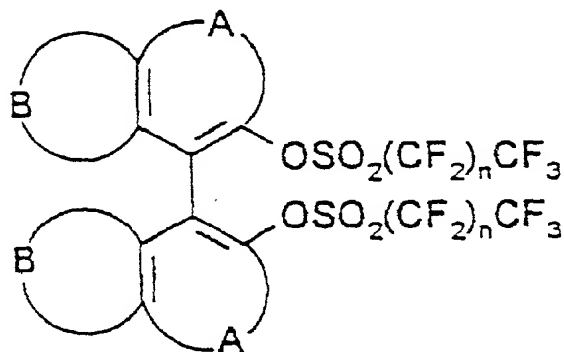
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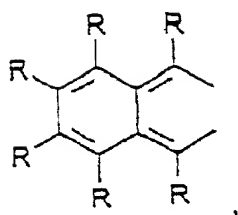
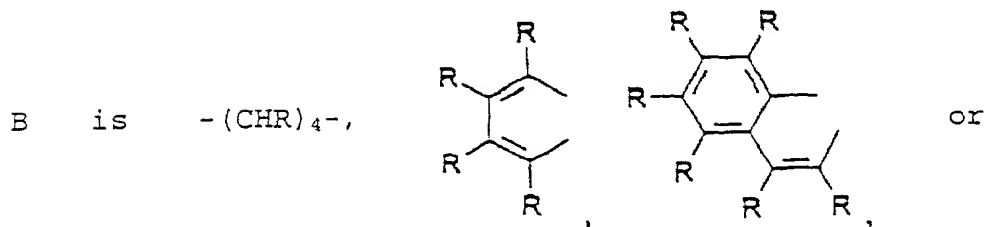
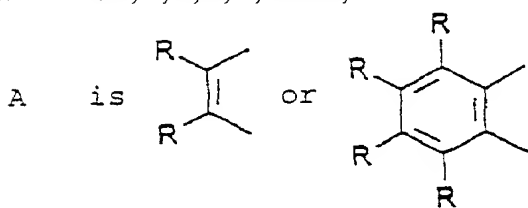
MARKED-UP VERSION

1. (Amended) Bis(perfluoro-n-alkanesulfonates) A bis(perfluoro-n-alkanesulfonate) compound of the formula I:



where

n is 3, 4, 5, 6, 7, 8 or 9,



where nonadjacent groups =CR- may be optionally replaced by =N-, and -CHR- may be optionally replaced by -NR-, -O- or -S-, provided that at least one =CR- or

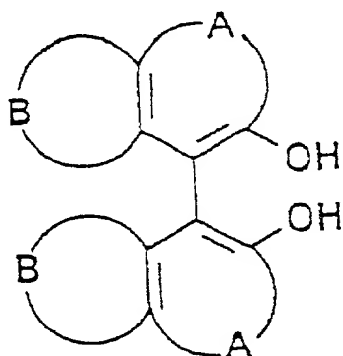
-CHR- group is so replaced,

and

R is alkyl or alkoxy having from 1 to 12 carbon atoms, halogen, -CN, -CF₃, -OCF₃ or unsubstituted phenyl or phenyl which is monosubstituted or polysubstituted by alkyl or alkoxy having from 1 to 12 carbon atoms, halogen or -CN, where if more than one R is present the substituents R may be identical or different.

3. (Twice Amended) A compound ~~Compounds~~ of the formula I according to Claim 1, ~~characterized in that~~ wherein R is alkyl or alkoxy having from 1 to 7 carbon atoms, F, Br, CN, -CF₃, -OCF₃.

5. (Amended) A process ~~Process~~ for preparing a compound of claim 1, which comprises reacting a compound ~~the bis(perfluoro-n-alkanesulfonates) of the formula I,~~ characterized in that the compounds of the formula II:



II

where A and B are as defined in ~~Claim 1~~ are reacted with a perfluoro-n-alkanesulfonyl fluoride, chloride or anhydride in the presence of a base.

6. (Amended) The process of ~~Process for preparing the compounds of the formula I according to Claim 5, characterized in that~~ wherein the compounds of the formula II are reacted with nonafluoro-n-butan sulfonyl fluoride or perfluoro-n-octanesulfonyl fluoride in the presence of a base.

